

**TWO NEOTROPICAL *HYPATOPA* WALSINGHAM (GELECHIOIDEA:  
COLEOPHORIDAE: BLASTOBASINAE) WITH RETRACTILE LABIAL  
PALPI: A PREVIOUSLY UNKNOWN LEPIDOPTERAN FEATURE**

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*Abstract.*—*Hypatopa cryptopalpella*, n. sp., is described and *H. brevipalpella* Walsingham, 1897, is redescribed. Males of both species possess retractile labial palpi, a feature not known to occur elsewhere in Lepidoptera. Male sex scales on the distal segment of the labial palpi are associated with a deep invaginated pocket from the lower end of the frontoclypeus, extending within the head cavity to the area between the bases of the antennae. The invaginated pocket is filled with a copious brown mass that is believed to be a secretion deseminated by the male sex scales on the labial palpi. The location of the glandular cells cannot be identified until specimens suitable for histological sectioning become available. A lectotype is designated for *Auximobasis brevipalpella* Walsingham, 1897, and it is herein transferred to *Hypatopa* Walsingham, 1907 (**new combination**).

*Key Words:* retractile labial palpi, Blastobasini, Dominica, Grenada, West Indies

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The Blastobasinae are small to medium-sized moths, with less than 150 species known world wide. This number, however, greatly underestimates the species richness of the group because many undescribed species, especially from North America and the Neotropics, are represented in museum collections. Although the blastobasine moths are probably one of the most commonly collected groups of Gelechioidea in the New World, this subfamily may be one least known to science.

Since Meyrick (1894) the Blastobasinae have been considered to be a monophyletic group. Recent studies (Adamski and Brown 1989; Hodges 1998) have corroborated this view and have rigorously established the monophyletic relationships among the genera and the phylogenetic relationships of the Blastobasinae within Gelechioidea. In

this paper the Blastobasidae (*sensu* Adamski and Brown 1989) are treated as a subfamily within the Coleophoridae, following Hodges (1998), and *Hypatopa* Walsingham, 1907, to which the two species are assigned herein, are referred to the Blastobasini.

Nearly one-fourth of the 69 species of Neotropical Blastobasinae described are from the Lesser Antilles of the West Indies. All but one of these species, *Pigritia troctis* Meyrick, 1922, were described by Walsingham (1892, 1897), and most of these species are from St. Thomas. The remaining few species are from Grenada, St. Vincent, and Barbados.

*Hypatopa* includes 23 species from North American and several species from the Neotropics (new combinations of Walsingham, Meyrick, and Zeller to be recognized in the future by the author). More-

over, the genus contains dozens of undescribed species from both faunal regions known by the author.

This paper not only describes a new species of *Hypatopa* from Dominica but includes another previously described species and hypothesizes their relationship based upon the presence of retractile labial palpi, a feature not previously known to occur in Lepidoptera.

#### METHODS

Adults were examined with an incandescent light source (reflected light). *The Methuen Handbook of Colour* (Kornerup and Wanscher 1978) was used as a color standard for the description of the adult. Genitalia were dissected as described by Clarke (1941), except mercurochrome and chlorazol black were used as stains. Slide preparations were examined with dissecting and compound microscopes. Measurements were made with a calibrated ocular micrometer. Names of genitalic structures are described and follow Adamski and Brown (1989).

The gross morphology of the head of *Hypatopa cryptopalpella* Adamski was studied after scales were removed using a fine camel's hair brush, cut about  $\frac{1}{8}$  length. Specimens were then placed in glycerine on a depression slide and illustrated using a camera-lucida.

The ultrastructure of the head of *Hypatopa cryptopalpella* was studied with an Hitachi HH-S-2R scanning electron microscope at an accelerating voltage of 20 kV. For SEM examination, heads and their appendages were obtained from pinned specimens, mounted on stubs with silver paint and paste, and coated with gold-palladium in a Polaron E5100 sputter coater.

***Hypatopa cryptopalpella* Adamski,  
new species  
(Figs. 1–17, 20)**

**Diagnosis.**—Male with retractile labial palpi, deep invaginated pocket from lower end of the frontoclypeus to the area be-

tween the bases of the antennal sockets; valva with dorsal articulation reflexed distally, forming an arch; sacculus smooth, except outer margin with a cluster of bladelike setae between a dorsal obtuse spine and a ventral row of long marginal setae; base of upper part of valva deeply dentate; apical process of lower part of valva reduced; anellus with two overlapping plates, each with marginal setae; antrum of female with two spinelike projections.

**Description.**—*Male head* (Figs. 2–3, 15): Vertex and frontoclypeus with grayish-brown scales tipped with pale grayish brown, or mostly with grayish-brown scales intermixed with pale-brown scales, or concolorous pale grayish-brown scales. One specimen near white, and few specimens with mostly orange-gray scales, intermixed with pale orange-gray scales; scales of vertex intermixed with few iridescent bluish-violet sex scales. Antennal scape and pedicel as above, except scape with iridescent bluish-violet squamiform sex scales on ventral surface and dorsodistal margins, and cylindrical sex scales on posterior margin near base (Figs. 12–14); squamiform sex scales of scape with narrow scutes and many windows (Fig. 14), as compared to adjacent unspecialized scales with broad scutes and few windows (Fig. 15); flagellum grayish brown, with many short sensory hairs, nearly twice diameter of female flagellum; retractile labial palpus recurved in front of frontoclypeus (Figs. 5–6) or inserted into a deep invaginated pocket from lower end of frontoclypeus, extending within head cavity to the area between bases of antennal sockets (Figs. 2–3); labial palpus with basal segments pale grayish brown, terminal segment with elongate iridescent bluish-violet sex scales on apical part (Figs. 5–11); sex scales with scutes broad and spatulate, with a raised distal part, windows appear absent; proboscis patterned as frontoclypeus.

*Female head* (Fig. 4): As male, except sex scales and invaginated pocket absent; labial palpus longer than that of male (Fig.



Fig. 1. Holotype of *Hypatopa cryptopalpella*.

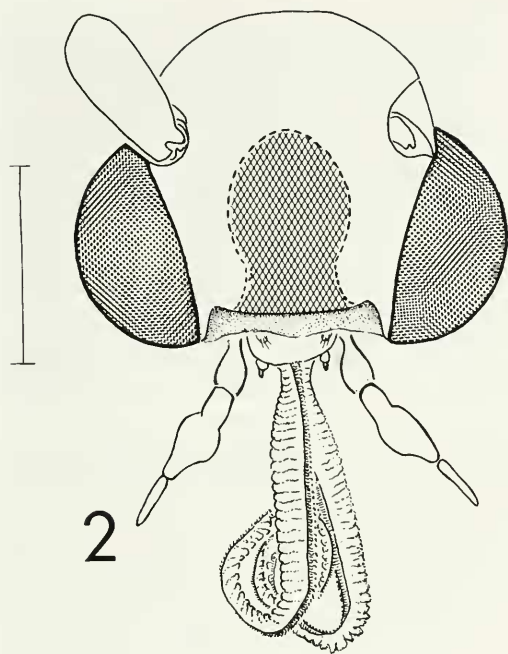
4), patterned as frontoclypeus, but paler on inner surface; second segment about twice length of terminal segment, basal segment short.

*Thorax:* Tegula and mesoscutum grayish brown intermixed with pale grayish-brown scales; male with dark brown-scales at base. Some specimens with tegula paler than mesoscutum. Legs with outer surface scales brown tipped with white, or brown intermixed with white scales; legs mostly white near distal end of segment and tarsomeres, forming ring pattern; inner surface mostly white, intermixed with few brown and pale-brown scales. Forewing (Fig. 1): length 4.9–6.0 mm ( $n = 33$ ), mostly with pale orange-gray scales, or orange-gray scales tipped with white; male with some brown scales along base of costa and base of wing. Some specimens with distal  $\frac{2}{3}$  wing darker

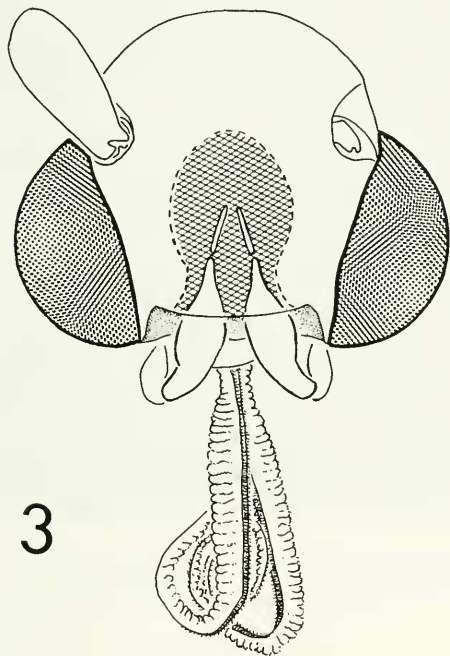
than basal  $\frac{1}{3}$ . Discal cell with two brown spots near end of cell present or absent, midcell spot absent; undersurface uniform pale brown, except male with dark-brown scales at base extending to about  $\frac{1}{2}$  length of wing within cell; venation (Fig. 16) with four-branched cubitus;  $CuA_2$  near right angle to base of  $M_2$  and  $M_3$ . Hindwing pale brownish gray; venation (Fig. 17) with three-branched cubitus.

*Abdomen:* Pale grayish brown, except brown on ventrolateral surface.

*Male genitalia* (Fig. 17): Uncus absent; gnathos medially reduced beneath tuba analis; tergal setae present; vinculum a thin band; juxta divided; valva with dorsal articulation reflexed distally, forming an arch; sacculus smooth, except lower margin with a cluster of bladeliike setae between a distal obtuse spine and a row of long proximo-



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Figs. 2-3. Head of *Hyatopa cryptopalpella*. 2, Head with labial palpi extended. 3, Head with labial palpi within head capsule. Scale = 1.0 mm.

basal setae along margin; base of fingerlike upper part of valva with outer margin deeply dentate; apical process of lower part of valva reduced; aedeagus slightly angled, anellus with two overlapping plates, each with marginal setae.

*Female genitalia* (Fig. 20): Ovipositor in four membranous telescopic subdivisions; ostium within membrane slightly posterior to segment seven; antrum membranous with two large spinelike projections, each pointed posteriorly, and convergent basally; inception of ductus seminalis within a slightly bulbous part of ductus bursae; corpus bursae subspherical, with spinelike signum.

*Holotype*.—♂, "DOMINICA, Pont Casse, 2 mi[les] N[orth] W[est], V-1965, D. R. Davis". The holotype is not dissected and is deposited in the National Museum of Natural History [USNM], Smithsonian Institution, Washington, D.C., USA.

*Paratypes*.—12 ♂, 11 ♀, same data as holotype except, "♂ Genitalia Slide by DA 3471, USNM 81624" [green label]; "♂ Genitalia Slide by DA 3472, USNM 81625" [green label]; "♂ Wing Slide by DA 3475, USNM 81628" [green label]; "♀ Genitalia Slide by DA 3473, USNM 81626" [green label]; "♀ Genitalia Slide by DA 3474, USNM 81627" [green label]; "♀ Wing Slide by DA 3476, USNM 81629" [green label]. 3 ♂, 5 ♀, "DOMINICA B[ritish] W[est] I[ndies], Antrim 1000' [feet], 11-III-1956, J. F. G. Clarke", "Smithsonian Bredin Exped[ition]"; 5 ♂, 3 ♀, same data as above except, "18-III-1956"; 1 ♀, same data as above except, "10-III-1956"; 1 ♀, same data as above except, "22-III-1956". All paratypes are deposited in the National Museum of Natural History [USNM], Smithsonian Institution, Washington, D.C.

*Etymology*.—The Greek prefix *crypto* and the suffix, *palpella* together mean "hidden palpus", and refer to the retractile labial palpi of the male.

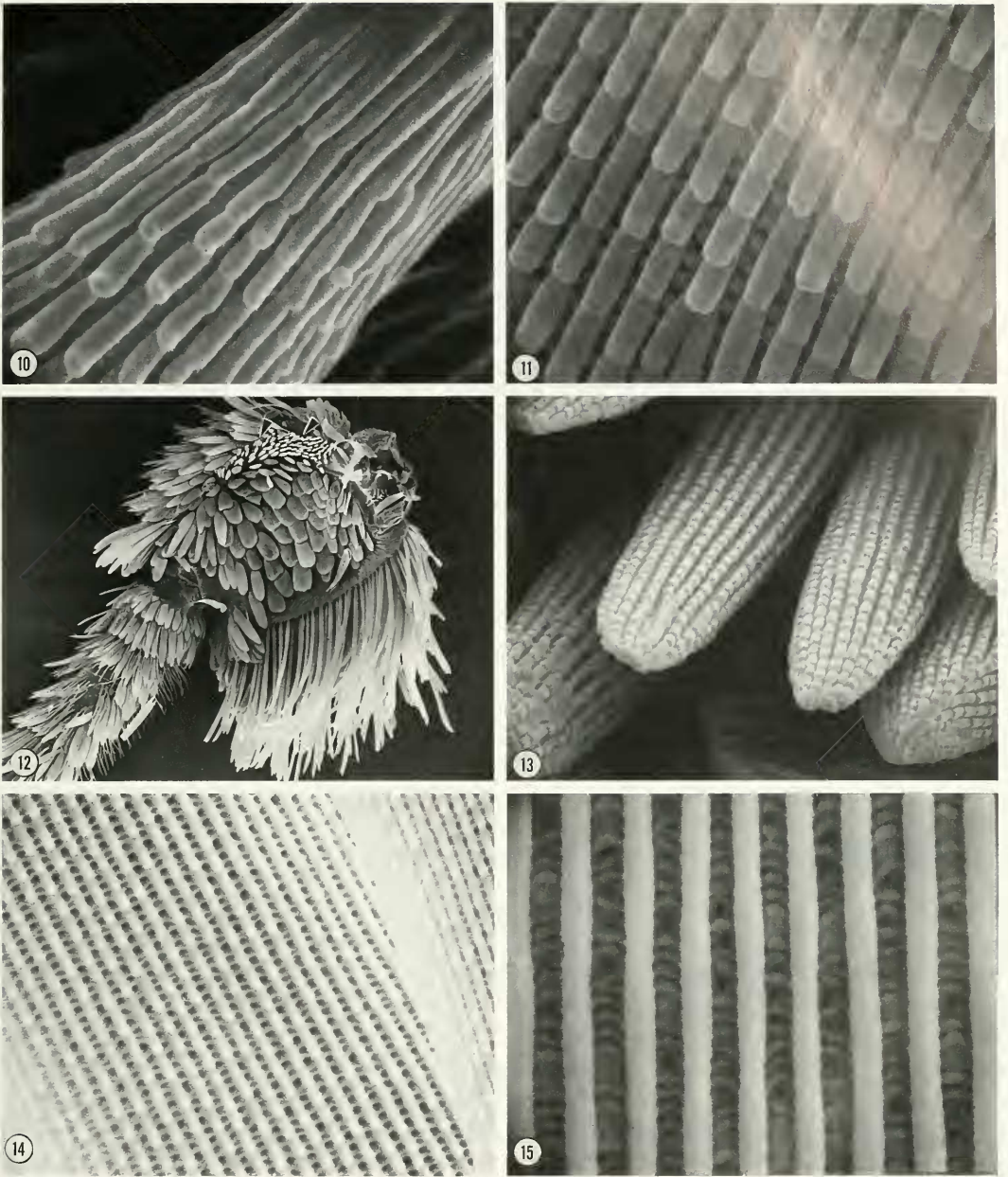
*Remarks*.—*Hyatopa cryptopalpella* differs from *H. brevipalpella* in having a gray-



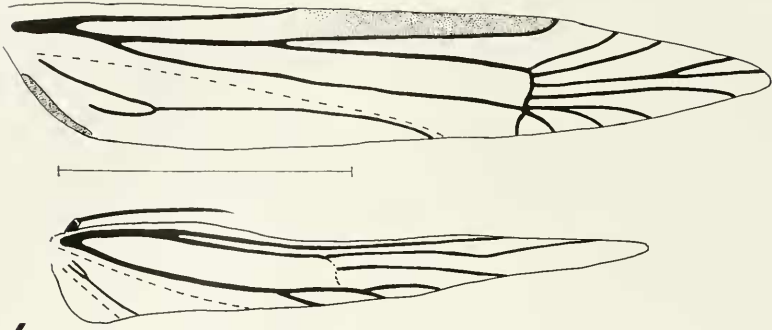
Figs. 4-9. Scanning electron micrographs of head of *Hyatopa cryptopalpella*. 4, Frontolateral view of female, 86 $\times$ . 5, Frontolateral view of male, 102 $\times$ . 6, Inner surface of male right labial palpus, 200 $\times$ . 7, Lateral view of male right labial palpus, 250 $\times$ . 8, Apical area of male right labial palpus, 650 $\times$ . 9, Apical area of male sex scales on apical portion of labial palpus, 15,000 $\times$ .

ish-orange or pale grayish-orange ground color of the forewings, midcell spot of the discal cell absent, and the median fascia absent. *H. brevipalpella* has a grayish-brown

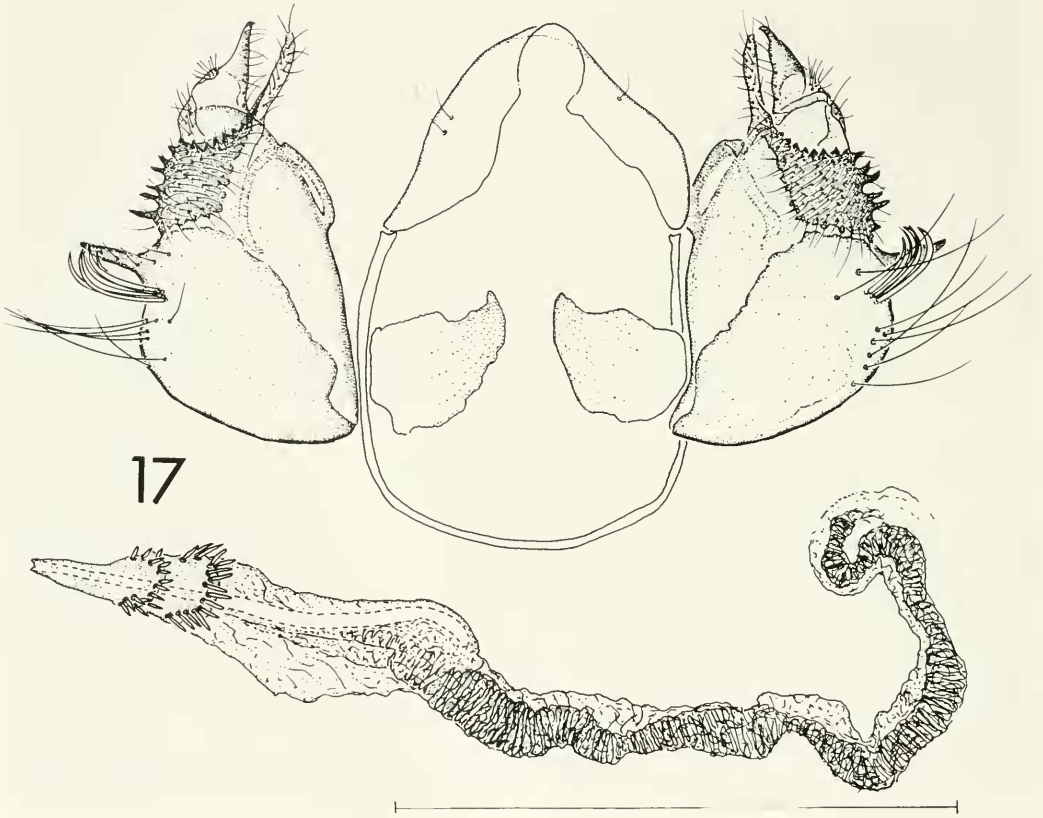
ground color of the forewings, all discal spots present, and an incomplete median fascia. Male and female genitalia of both species differ as figured.



Figs. 10–15. Scanning electron micrographs of head scales of *Hyatopa cryptopalpella*. 10, Apical area of male sex scale on apical portion of labial palpus, 15,000 $\times$ . 11, Central area of male sex scale on apical portion of labial palpus, 15,000 $\times$ . 12, Undersurface of basal portion of male left antenna, note arrows pointing to cylindrical sex scales on posterior margin of scape, 175 $\times$ . 13, Cylindrical sex scales on posterior margin of scape, 8,000 $\times$ . 14, Squamiform scale on underside of male scape, 25,000 $\times$ . 15, Squamiform unspecialized scale of scape, 7,750 $\times$ .



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Figs. 16–17 Wing venation and male genitalia of *Hyatopa cryptopalpella*. 16, Wing venation. Scale = 1.0  
 17, Male genital capsule and aedeagus. Scale = 0.5 mm.

*Hyatopa brevipalpella* (Walsingham  
 1897), **new combination**  
 (Figs. 18–19, 21)

*Auximobasis brevipalpella* Walsingham  
 1897:95; Becker 1984:41.

Diagnosis.—Male with retractile labial palpi, dorsal articulation of valva reflexed toward vinculum, sacculus setose, with a small cluster of stout setae near distal margin, juxta divided. Female with microtrichiate membrane surrounding ostium.



Fig. 18. Lactotype of *Hypatopa brevipalpella*.

**Description.**—*Head:* Vertex and frontoclypeus with scales mostly grayish brown, intermixed with grayish-brown scales tipped with pale grayish brown; distal portion of labial palpus inserted into a pocket in head capsule as in *H. cryptopalpella*, as far as could be ascertained without dissecting unique male specimen; visible basal portion grayish brown. Female labial palpus as in *H. cryptopalpella*. Antennal scape and pedicel as frontoclypeus, flagellum gray; proboscis pale brown.

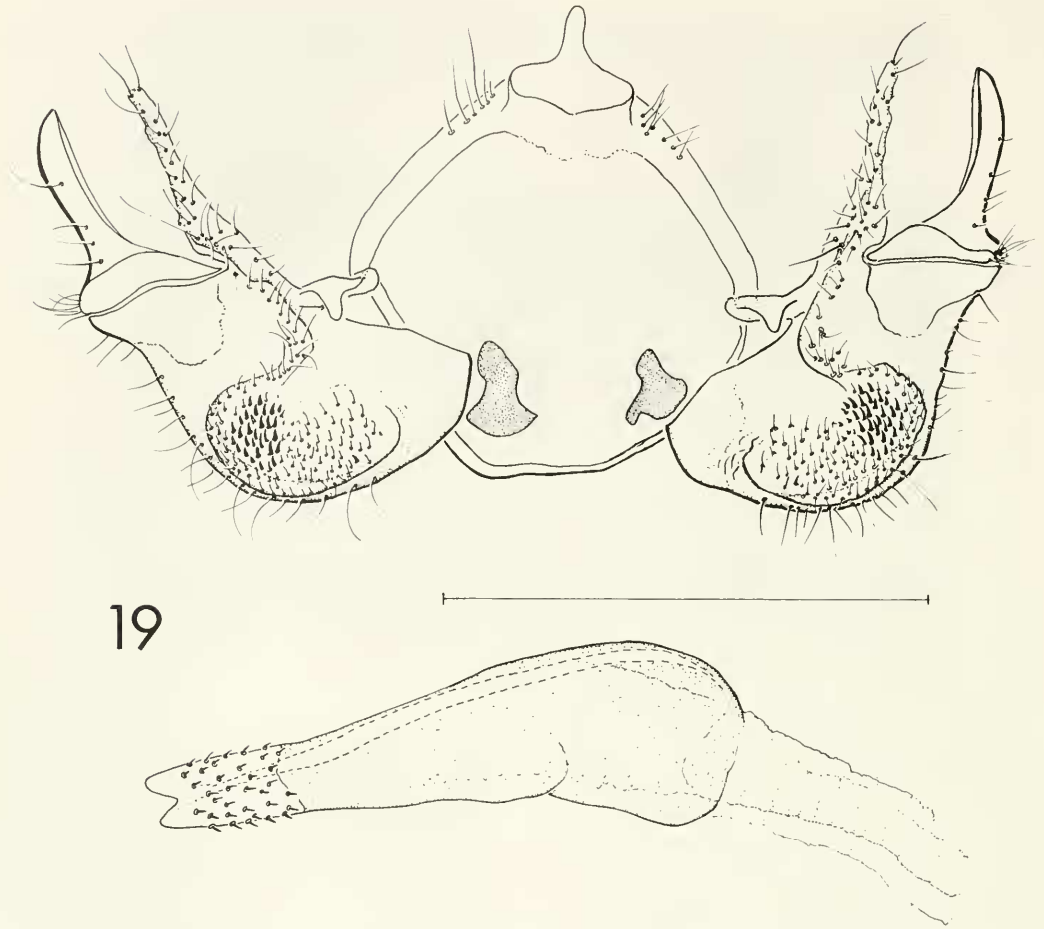
*Thorax:* Tegula and mesoscutum mostly with brown scales, intermixed with brown scales tipped with pale brown, and pale-brown scales tipped with white. Legs with outer surfaces mostly brown, intermixed with pale-brown scales, and pale-brown scales tipped with white, inner surface mostly with pale-brown scales, intermixed with white scales. Scales mostly white near distal end of segments and tarsomeres. Forewing (Fig. 18): length 5.0–5.2 mm ( $n = 3$ ), mostly grayish-brown scales, intermixed with pale grayish-brown scales and white scales; costal and outer margin

brown, fringe scales between  $R_1$  and  $R_5$  with alternating pale and dark patches forming an irregular marginal pattern; median fascia incomplete, obliterated by pale-brown scales near midcell; two dark-brown spots near distal margin of cell, and one faint spot near midcell; a brown streak between wing base and median fascia, posterior to CuP. One specimen with distal  $\frac{2}{3}$  darker than basal  $\frac{1}{3}$ . Undersurface brown. Hindwing pale brownish gray, gradually darkening to outer margin. Venation not studied.

*Abdomen:* Pale brownish gray.

*Male genitalia* (Fig. 19): Uncus short, apex rounded; gnathos forming a thin band around tuba analis; tergal setae present; vinculum, a thin ventral support; juxta divided; dorsal articulation of valva reflexed toward vinculum; distal process of lower division of valva not freely articulated with basal part; basal part with marginal setae; sacculus setose (with mostly hairlike setae), a small circular cluster of stout setae on distal part; distal process of upper division of valva with a sclerotized ridge fusing with sac-





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Fig. 19. Male genital capsule and aedeagus of *Hyatopa brevipalpella*. Scale = 0.5 mm.

culus; upper part of valva setose. Aedeagus broad at base narrowing to apex; anellus uniformly setose.

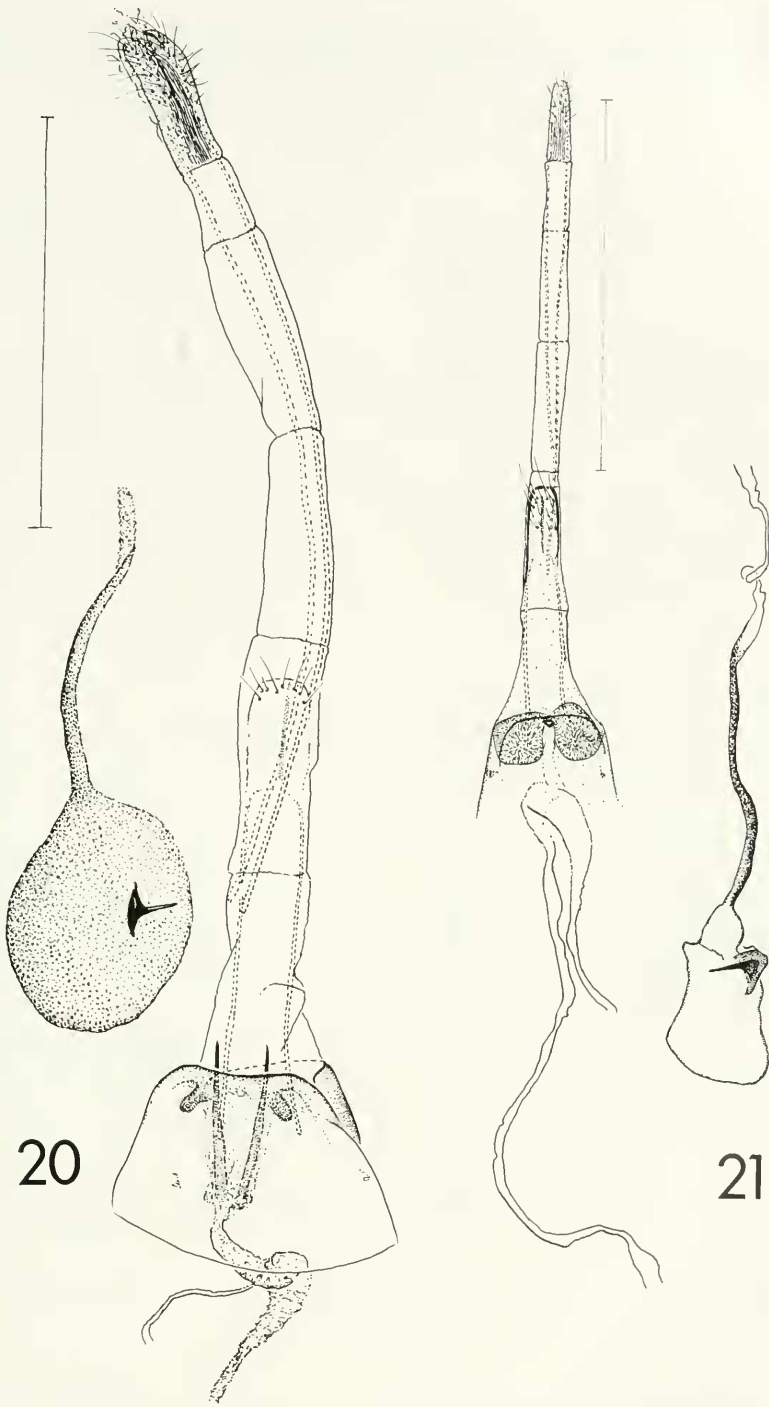
*Female genitalia* (Fig. 21): Ovipositor as *H. cryptopalpella*; ostium within membrane slightly posterior to sternum seven; microtrichiate membrane surrounding ostium; inception of ductus bursae and ductus seminalis demarcated by short, parallel-sided membranous antrum; inner surface of anterior  $\frac{1}{3}$  of ductus bursae spinulate; corpus bursae with a spinelike signum.

Type examined.—Lectotype here designated, ♂, "Balthazar, Windward side, Grenada, W[est] I[ndies], H. H. Smith [Collector]". "BM-♂ genitalia slide no. 26567".

In The Natural History Museum, London, England (BMNH).

Paralectotypes.—1 ♀, "Mount Gay, Est [action], (Leeward Side), Grenada, W[est] I[ndies], H. H. Smith, 25-30-VIII", "Walsingham Collection, 1910-427, 65298", "*Auximobasis brevipalpella* WLSM, Type ♀" [Specimen is missing abdomen]. 1 ♀, same data as above except, "Paratype  $\frac{1}{2}$ ", "BM ♀ genitalia slide no. BM 26568". 1 ♀, same data as above except, "I-5-X", "Walsingham Collection, 1910-427, 65305", "Paratype  $\frac{2}{2}$ " [Specimen is not dissected]. All three paralectotypes are in BMNH.

Remarks.—Because only one male is



Figs. 20–21. Female genitalia of *Hypatopa* spp. 20, *H. cryptopalpella*. 21, *H. brevipalpella*. Scale = 1.0 mm.

known of this species, I did not dissect the head to confirm the presence of sex scales on the distal part of the labial palpi or the presence of the deep invaginated cranial pocket.

#### DISCUSSION

The invaginated pocket found in male *H. cryptopalpella* is filled with a copious mass that is probably a secretion deseminated by sex scales on the labial palpi. The location of the glandular cells responsible for the secretion of this material cannot be identified until suitable specimens are available for histological studies.

The numerous genitalic differences between *Hypatopa cryptopalpella* and *H. brevipalpella* are hypothesized to be elaborations from different branches of the same evolutionary lineage. Consequently, the evolution of the retractile labial palpi in males and the deep invaginated cranial pocket are features that have evolved only once within this lineage. This hypothesis, however, can only be tested through phylogenetic analysis of *Hypatopa*.

#### ACKNOWLEDGMENTS

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graph of the holotype of *Hypatopa cryptopalpella*. This research was supported in part by grants from NSF Grant BSR85-01212 and Sigma Xi.

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